MAPPING AND GIS IMPLEMENTATION OF LAND USE AND LAND COVER CATEGORIES FOR THE ALBEMARLE-PAMLICO DRAINAGE BASIN

INTRODUCTION

The Albemarle-Pamlico (A/P) system in North Carolina is one of several estuaries which have been intensively studied under the auspices of the U.S. Environmental Protection Agency's National Estuary Program. The ultimate goals of the A/P Study have been to support research efforts aimed at assessing environmental problems facing the estuarine system and to provide basic information needed to formulate management strategies for the area. The lack of a current land use/land cover inventory for the A/P estuary drainage area was identified as a critical gap in the A/P Study resource database. At an A/P Study workshop held late in 1987, Landsat Thematic Mapper (TM) digital data were recommended as the most cost effective and practical source for developing an inventory of the drainage basin. The Computer Graphics Center (CGC) (North Carolina State University) and the North Carolina Center for Geographic Information & Analysis (CGIA) were given responsibility for the development, storage, and dissemination of the inventory. The CGC is a university-wide research unit independent of any department or university college. The mission of CGC is to facilitate and conduct research and training in the fields of remote sensing, image processing, spatial information systems, and database design and management. The CGIA, a receipt funded agency, operates a Geographic Information System (GIS) and serves as the official repository of digital geographic data for the state of North Carolina. CGIA had previously been selected as the data management center for the A/P Data Management Program. A primary responsibility for CGIA is the development and maintenance of the A/P database.

Study Area

The Albemarle-Pamlico estuarine system is one of the largest estuaries in the U.S. It includes five major rivers: Chowan, Roanoke, Alligator, Tar-Pamlico, and Neuse, and many smaller tributaries. The estuarine system actually encompasses Albemarle, Pamlico, Currituck, Roanoke, Croatan, and Core Sounds. The entire drainage basin covers about 23,500 square miles (61,000 square km) of land and water in eastern North Carolina and southeastern Virginia (see Appendix I for a list of counties and quadrangles covered). This figure is based on the A/P drainage boundary in CGIA's database and does not include the upper Roanoke River. In the last 20 years, the A/P system has experienced more frequent and intense occurrences of algal blooms and fish or shellfish infections, increased turbidity, loss of submerged aquatic vegetation, and other evidence of degraded water quality. Population growth and associated increases in the demands placed on resources have resulted in greater pressures on these ecosystems. The estuarine systems are affected not only by activities in the immediate area, but by activities occurring upstream in large portions of the more populated Piedmont.

The A/P drainage basin encompasses portions of both the Coastal Plain and the Piedmont provinces of North Carolina and Virginia (Figure 1). The Coastal Plain is characterized by its low elevation (< 300 feet) and relatively young, unconsolidated sediments. The Coastal Plain